

U.S. PATENT APPLICATION

for

**RETENTION DEVICE FOR STORAGE OF DOCUMENTS AND
OBJECTS**

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RETENTION DEVICE FOR STORAGE OF DOCUMENTS AND OBJECTS

BACKGROUND OF THE INVENTION

5 **[0100]** The present invention relates generally to the field of document management and storage systems.

[0101] Few objects are more ubiquitous in an office environment than files, folders, boxes and other means for storing paper. In a typical document management
10 system, documents may be kept in file folders, either loosely or clipped in stacks. The file folders in turn may be kept in boxes, or on shelves. Bookends or hanging tabs may be used to maintain the files in some degree of order, but they are often instead simply stacked together, at the risk of slipping out of alignment under adjacent files.

15 **[0102]** The problem is worse when papers are stored outside of a relatively rigid file or folder. Unless the storage container is filled from end to end with documents, it is inevitable that some will slide out of vertical orientation to become stacked on top of one another. Locating any individual document in the resulting pile can be a difficult, frustrating exercise that produces crumpled or torn paper.

20 **[0103]** Organizations which archive documents that must be maintained in their original condition (such as the Library of Congress) often need to store relatively small collections of related documents. The cost of obtaining storage containers suited to the size of each individual collection would be prohibitive, even if such containers were
25 available. Instead, devices such as spacer boards of varying sizes are utilized to fill the space within existing storage containers not occupied by the stored documents. Although

effective, such boards necessarily have to be manufactured in different sizes to suit storage containers of different dimensions.

5 **[0104]** Spacers are also used in shelving systems. Typically, parallel bars are installed on a shelf and joined by a spacer plate. The position of the spacer plate can be adjusted as the volume of items stored on the shelf require; e.g., by sliding the spacer plate and securing it in place by attachment to preset positions along the parallel bars. The need for preset points of attachment along the parallel bars necessarily limits the extent to which the position of the spacer plate can be adjusted.

10 **[0105]** A need, therefore, exists for a storage system which maintains documents and other objects in easily accessible alignment or other orientation, while being fully adjustable to accommodate collections of different sizes in storage containers of larger dimensions.

SUMMARY OF THE INVENTION

15 **[0106]** The invention provides a spring-loaded compression device for retention of documents or other objects within a storage container, or on a surface, such as a shelf.

20 **[0107]** In general, the device includes a mechanism consisting of a spring-loaded pusher plate, which is adapted to fit within a storage container, or on a surface, as in a shelving unit. The pusher plate is attached to one or more springs that are extendable up to the length of the storage area, and can be secured in a fully compressed position.

25 **[0108]** When the spring(s) is released, the pusher plate moves into contact with any adjacent document or object, applying compressive force thereto to maintain the document or object in a desired position. The position of the plate can be adjusted to a nearly infinite extent within the overall extension range of the spring. In general, at least

25% of the surface area of the pusher plate will fall within the diameter of the spring coils, to prevent the plate from angling out of vertical alignment when moved.

5 **[0109]** In one embodiment of the device, the device is adapted for permanent or temporary placement within a storage container, such as a box or crate, or on a shelf. In such embodiments, the attachment means for the spring may be formed as an integral or permanently attached part of the storage container or shelving unit.

10 **[0110]** In another embodiment of the device, the device is free-standing for portable use. For example, free-standing embodiments of the device may be utilized as single or dual bookends. Alternatively, the attachment means may be removably joined to an end of the storage container or shelving unit, so the device may be removed when the container is or shelf is full.

15 **[0111]** In dimensions and structure, the device of the invention can be adapted to universal use with storage containers or shelving units of different sizes and designs. The device therefore provides a simple solution for storage of documents and objects in storage units of larger size, and eliminates the need for custom manufacture of boxes or other storage units for use with the device of the invention, or vice versa.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0112] FIG. 1 is an expanded view of the device of the invention, with a spring in a fully expanded posture, adapted for use with a standard document storage box.

25 **[0113]** FIG. 2 is a side view of the device of FIG. 1, with a spring component of the device shown in a compressed posture.

[0114] FIG. 3 is a front view of securing means used in the device of the invention to maintain a spring in a fully compressed posture.

5 [0115] FIG. 4 is a side view of the device of FIGS. 1-3, with additional securing means applied in the form of a clip to maintain the spring in a fully compressed posture.

[0116] FIG. 5 shows the device of FIGS. 1-3, disposed in a fully compressed posture within a document storage box.

10 [0117] FIG. 6 shows the device of FIGS. 1-3, with the spring in a partially compressed posture, in use to maintain documents in an aligned position within the document storage box of FIG. 5.

15 [0118] FIG. 7 shows the device of the invention, with a spring in a fully extended posture, adapted for use on a shelf of a shelving unit, and in use to maintain files in an aligned position.

20 [0119] FIG. 8 shows the device of the invention, with a spring in a fully extended posture, adapted for use on a desk as a bookend, and in use to maintain files in an aligned position.

[0120] FIG. 9 shows the devices of the invention, with multiple springs in fully extended postures.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0121] Figure 1 provides an exploded view of the device of the invention, adapted for use within a standard document storage box. The device consists of two opposing plates, 1 and 2. In this embodiment, plate 1 serves as a pusher, to compress documents or other objects in alignment within a storage container, while plate 2 serves as a support for spring 3. It will be understood, however, that it is possible to use the device to place documents or other objects at either end of it, whereby both plates 1 and 2 would serve as pushers.

[0122] As shown, both the pusher plate 1 and support plate 2 are of substantially equal dimensions, and are constructed of a lightweight sheet metal. Those of ordinary skill in the art will recognize that materials other than sheet metal can be used to fabricate plates 1 and 2, so long as the material can withstand the compressive force applied by spring 3 without warping or cracking.

[0123] Spring 3 is shown in Figure 1 in a fully extended posture. The last coils on either end of spring 3 are securely attached to, respectively, pusher plate 1 and support plate 2, by pins 4 extending through the plate wall and around the coil. As shown in Figure 2, hooking the coils to the plate in this fashion helps to assure that the coils will not become dislodged as spring 3 compresses and expands. However, other means for attaching the coils to the plates may be utilized, such as bolts or welds.

[0124] As shown, approximately a third of the surface area of pusher plate 1 and support plate 2 is within the diameter of the coils of spring 3. For ease of reference, a single spring is referred to in this disclosure as being present in the device of the invention. However, it will be appreciated that multiple springs may be utilized in lieu of single spring 3, as illustrated in Figure 9.

5 **[0125]** Whether one or more springs are utilized, it is desirable that they be adapted to ensure that the plates are maintained in a substantially vertical alignment, instead of angling as they move in response to the coiling or uncoiling of the spring mechanism(s). To this end, at least 25% of the surface area of the plates is within the diameter of the coils of a single spring, or the collective coils of multiple springs.

10 **[0126]** Further, if multiple springs are present, it is desirable to have them arrayed to apply substantially equal pressure to the plates at opposing points on plates 1 and 2 (e.g., as shown in Figure 9, to the two bottom corners and to the center of pusher plate 2). To ensure that compressive force is applied appropriately to a sufficient surface area of plate 2 to prevent it from angling during motion, other kinds of biasing mechanisms, such as roller springs, are less useful in the invention.

15 **[0127]** As compressive force is applied to objects in contact with pusher plate 1 by uncoiling of spring 3, pressure is also placed on the walls of a storage container or shelving unit in which the device is placed. If the walls are at all flexible, they may become distorted by bowing outward away from the source of pressure. Further, the documents or objects in contact with pusher plate 1 may also crumple under spot pressure.

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[0128] For these reasons, it is preferable that pusher plate 1 (and support plate 2) have a length and width substantially equivalent to (e.g., at least 50% of) the length and width of the storage container, shelving unit and/or documents and objects with which the device is to be used. The plates may be of any desired geometry; e.g., square, circular or rectangular.

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[0129] Spring 3 is made of a conventional metal composite. It will be appreciated, however, that other materials may be utilized in the spring, including decorative materials (for home and office use in visible areas) and corrosion-resistant

materials for use in outdoor or inclement environments. A sheath, such as a gasket, may also be provided to spring 3 to cover its coils.

5 **[0130]** Before use, the device may be maintained for shipment or storage in a compressed position, as shown in Figure 4. Means to secure spring 3 in a fully compressed position are provided which are of sufficient resiliency to resist the tendency of spring 3 to uncoil.

10 **[0131]** As shown in Figure 3, the securing means consist of spring-loaded slidable bolt 5 mounted to bars 6A, 6B and 6C on support plate 2. It will be appreciated that tension can be applied to slidable bolt 5 to maintain it in a locked position within bars 6A, 6B and 6C by means other than spring-loading, or by means other than tensioning. Flange 7 is provided on pusher plate 1, with aperture 8 therethrough. Aperture 8 is positioned on flange 7 so that slidable bolt 5 can engage it when spring 3 is fully
15 compressed to bring aperture 8 into position beneath bar 6C (having a corresponding aperture therethrough, not shown) with respect to slidable bolt 5.

20 **[0132]** Additional means to secure spring 3 in a fully compressed position may also be provided, such as one or more units of clip 9, shown in Figure 4; a band around pusher plate 1 and support plate 2; or a bolt extending horizontally between them.

25 **[0133]** Turning to Figure 5, the device of Figures 1-3 is shown in place within a standard cardboard document storage box 10 having end walls 11 and 12, and side walls 13 and 14. Slidable bolt 5 is engaged in aperture 8 of flange 7 to maintain spring 3 in a fully compressed posture. Both pusher plate 1 and support plate 2 have carve-outs to correspond to the hand-holds that are typically present in document storage boxes.

[0134] In this embodiment, the device is not permanently attached at support plate 2 to end wall 11, and so can be removed from box 10. The device can therefore be

used repeatedly, for a variety of storage needs. To this end, pusher plate 1 and support plate 2 will preferably be substantially square in shape, with straight edges. This design will allow the device to be used with a number of different standard storage options, such as boxes and shelves, thereby expanding the versatility of the device while avoiding
5 custom manufacture costs.

[0135] It will be appreciated, however, that the device may be adapted for permanent installation within or on a storage unit. For example, support plate 2 may alternatively be permanently attached to end wall 11; e.g., by providing box 10 with a slot
10 along the face of end wall 11 into which support plate 2 may be fitted, with an aperture, as necessary, for slidable bolt 5 or other securing means and spring 3 to protrude out of the slot for engagement with flange 7. Alternatively, where the storage container is of molded or extruded manufacture, support plate 2 may be integrated into an end wall of the container; e.g., by co-molding or co-extrusion.

15 [0136] Pusher plate 1 and support plate 2 are slightly smaller in dimension than end walls 11 and 12, respectively, of box 10. A gap is therefore left between the edges of each plate and the inside surfaces of side walls 13 and 14, to allow pusher plate 1 freedom of motion.

20 [0137] Figure 6 depicts the device with spring 3 in a partially compressed position. A collection of documents 15 are shown in an aligned, vertical posture adjacent to pusher plate 1. In use, documents 15 or another object is inserted into the space between pusher plate 1 and end wall 12 (Figure 5) when spring 5 is fully compressed.
25 Slidable bolt 5 is disengaged from flange 7, to allow spring 3 to uncoil, bringing pusher plate 1 into contact with the documents or objects to apply compressive force thereto.

[0138] The compressive force applied has to be sufficient to maintain the documents or objects in the desired orientation, without placing more pressure on the

items, storage container or shelving unit than they can easily withstand. The amount of pressure will vary by the context in which the device is used, and with the length of the spring, but a range of spring tension of 5 to 30 psi (on full compression) can generally be expected to be suitable, with tensions in the 10 to 20 psi range being preferable for use of the device with books, documents or files. Those of ordinary skill in the art will be able to adjust the spring tension during manufacture upward or downward to accommodate use of the device for storage of lighter or heavier items.

[0139] To remove or add additional documents or objects to the storage container or shelving unit, pressure can be manually applied to pusher plate 1 to compress spring 3 slightly to create room adjacent to pusher plate 1 for addition or removal of documents or objects. On release, pusher plate 1 returns to contact with documents or objects already in the container or shelving unit, to ensure that their position in the storage area is maintained.

[0140] Figure 7 depicts a further embodiment of the invention, adapted for use on a shelf 16 of a shelving unit 17, wherein shelf 16 has end walls 18 and 19. Spring 3 is shown in a fully extended posture on shelf 16. The device is placed onto shelf 16, and used as described with respect to Figure 6, with support plate 1 contacting end wall 18, and pusher plate 2 separated from end wall 19 by files 20. Shelf 16 may also be adapted to include a slot (not shown) for friction-fit placement therein of the bottom edge of support plate 2, to secure the device on the shelf.

[0141] Figure 8 depicts a further embodiment of the invention, adapted for use on a surface, such as a desk, having only one immovable wall extending upwardly therefrom or adjacent thereto, such as a wall. As shown, the device has a pusher plate 21, support plate 22 and spring 23. Support plate 22 is disposed on a weighted base 24 (a weighted base, not shown, may also be joined to pusher plate 21). Spring 23 is fully extended to

compress files 25 between a room wall 26 and pusher plate 21. Used singly or in pairs, this embodiment of the invention essentially functions as one or more bookends.

5 **[0142]** Those of ordinary skill in the art will appreciate that there are numerous other contexts to which the device can be adapted. For example, the device could be utilized to prevent objects from moving in a car trunk or to secure items that might otherwise tend to roll out of place, such as cans stored on their sides.

10 **[0143]** The invention having been fully described, alternative means for carrying out the invention may be recognized by those of skill in the art. All such further means are included within the scope of the invention, which is defined by the appended claims.